

WHAT IS CLAIMED IS:

1. A resource brokering system for use with a wireless communication cell having at least one aperture array, comprising:

- a virtual sector broker configured to generate, in response to a resource request, an allocation request based on available wireless communication resources of said cell subjected to a brokering process;
- an internal policy broker database associated with said virtual sector broker; and
- a virtual sector formation unit configured to employ said at least one aperture array to provide dynamic virtual sectorization of said available wireless communication resources in response to said allocation request.

2. The resource brokering system as recited in Claim 1
wherein said available wireless communication resources include one
selected from the group consisting of:

beam pattern specification,

spectrum-on-demand,

dynamic provisioning or excess spectrum capacity sales,

channel access brokering, and

multiple objective optimization schemes using said available
wireless communication resources across a plurality of cell sites
or sectors within a cell site.

3. The resource brokering system as recited in Claim 1
wherein said virtual sectorization includes substantially
simultaneously forming dynamically assigned beam patterns.

4. The resource brokering system as recited in Claim 1
wherein said wireless communication resources are selected from the
group consisting of:

a spectrum,
a code modulation,
a beam pattern,
a spatial directionality,
a power,
a time interval, and
jointly optimized combinations thereof.

5. The resource brokering system as recited in Claim 1
wherein said virtual sector formation unit is further configured to
receive and send signals of various forms from at least one
wireless service provider via a transport network and perform
up/down conversions of said signal forms.

6. The resource brokering system as recited in Claim 1
2 wherein said wireless communication cell has at least two aperture
3 arrays and said virtual sector formation unit is dynamically
4 coupleable to said at least two aperture arrays via an optical
5 network, said virtual sector formation unit further configured to
6 employ said optical network to steer communication signals
7 dynamically to different ones of said at least two aperture arrays
8 in response to said allocation request.

7. The resource brokering system as recited in Claim 1
2 wherein said virtual sector broker is further configured to
3 generate said allocation request based on said available wireless
4 communication resources of a plurality of said wireless
5 communication cells.

8. The resource brokering system as recited in Claim 1
2 wherein said resource brokering system is employed over a region
3 having a plurality of wireless communication cells, said brokering
4 process including deterministic and statistical determinations of
5 allocations of said available wireless communication resources over
6 said region based on a restriction of cost, time, usage or
7 coverage.

9. A method of brokering resources of a wireless communication cell having at least one aperture array, comprising:
generating, in response to a resource request, an allocation request based on available wireless communication resources of said cell subjected to a brokering process; and
employing said at least one aperture array to provide dynamic virtual sectorization of said available wireless communication resources in response to said allocation request.

10. The method as recited in Claim 9 wherein said available wireless communication resources include one selected from the group consisting of:
beam pattern specification,
spectrum-on-demand,
dynamic provisioning or excess spectrum capacity sales,
channel access brokering, and
multiple objective optimization schemes using said available wireless communication resources across a plurality of cell sites or sectors within a cell site.

11. The method as recited in Claim 9 wherein said virtual sectorization includes substantially simultaneously forming dynamically-assigned beam patterns.

12. The method as recited in Claim 9 wherein said wireless
communication resources are selected from the group consisting of:
a spectrum,
a code modulation,
a beam pattern,
a spatial directionality,
a power,
a time interval, and
jointly optimized combinations thereof.

13. The method as recited in Claim 9 further comprising
receiving baseband signals from at least one wireless service
provider via an optical network and performing up/down conversion
of said baseband signals.

14. The method as recited in Claim 9 wherein said wireless
communication cell has at least two aperture arrays coupled to an
optical network, said method further comprising employing said
optical network to steer communication signals dynamically to
different ones of said at least two aperture arrays in response to
said allocation request.

15. The method as recited in Claim 9 wherein said generating
2 including generating said allocation request based on said
3 available wireless communication resources of a plurality of said
4 wireless communication cells.

16. The method as recited in Claim 9 wherein said method is
2 employed over a region having a plurality of wireless communication
3 cells over a region, said brokering process including providing
4 statistical determination of allocations of said available wireless
5 communication resources over said region based on a restriction of
6 cost, time, usage or coverage.

17. A wireless communication network, comprising:

a plurality of wireless communication cells, each of said plurality of cells having at least one aperture array coupled to an optical network;

a plurality of wireless service provider systems coupled to said optical network; and

a resource brokering system that receives resource requests from said plurality of wireless service providers, including:

a virtual sector broker configured to generate, in response to a resource request, an allocation request based on available wireless communication resources of said cell subjected to a brokering process,

an internal policy broker database associated with said virtual sector broker,

a virtual sector formation unit configured to employ said at least one aperture array to provide dynamic virtual sectorization of said available wireless communication resources in response to said allocation request,

a per service provider broker agent,

a per resource provider broker agent,

a plurality of aperture array, and

opportunistic measurement functional unit.

18. The wireless communication network as recited in Claim 17
wherein said available wireless communication resources include one
selected from the group consisting of:

beam pattern specification,
spectrum-on-demand,
dynamic provisioning or excess spectrum capacity sales,
channel access brokering, and
multiple objective optimization schemes using said available
wireless communication resources across a plurality of cell sites
or sectors within a cell site.

19. The wireless communication network as recited in Claim 17
wherein said virtual sectorization includes substantially
simultaneously forming dynamically assigned beam patterns.

20. The wireless communication network as recited in Claim 15
wherein said wireless communication resources are selected from the
group consisting of:

a spectrum,
a code modulation,
a beam pattern,
a spatial directionality,
a power,
a time interval, and
jointly optimized combinations thereof.

21. The wireless communication network as recited in Claim 15
wherein said virtual sector formation unit further receives
baseband signals from said plurality of wireless service provider
systems and performs up/down conversions of said baseband signals.

22. The wireless communication network as recited in Claim 15
wherein said virtual sector formation unit dynamically coupleable
to said at least one aperture array of each of said plurality of
cells via said optical network, said virtual sector formation unit
employing said optical network to steer communication signals
dynamically to different ones of said at least one aperture array
or each of said plurality of cells in response to said allocation
requests.

23. The wireless communication network as recited in Claim 15
2 wherein said plurality of cells is employed over a region and said
3 brokering process includes statistical determination of allocations
4 of said available wireless communication resources over said region
5 based on a restriction of cost, time, usage or coverage.